

EXECUTIVE SUMMARY

On April 20, 2010, an explosion and fire occurred on the semi-submersible offshore drilling rig, Transocean Deepwater Horizon drill rig at British Petroleum Site Mississippi Canyon 252 in the Gulf of Mexico, approximately 50 miles offshore of Venice, Louisiana. On April 24, 2010, it was found that the wellhead was damaged and leaking crude oil into the Gulf of Mexico. The Secretary of Homeland Security declared the discharge of the oil a Spill of National Significance (SONS), herein known as the British Petroleum Spill (BP Spill). The BP Spill poses a serious threat to the quality of the environment and a potential threat to human health along the Gulf of Mexico. The mission of the U.S. Environmental Protection Agency (EPA) is to protect human health and the environment. In order to fulfill that mission, EPA is supporting the U.S. Coast Guard's response to the BP Spill by establishing a baseline of water and sediment quality along the Gulf coast based on data from the National Coastal Condition Assessment (NCCA) (2000-2006), post-Katrina sampling, and 2010 pre-impact sampling.

EPA took a number of samples along the coastal areas of Louisiana, Mississippi, Alabama, and Florida to develop baseline information. Concurrently, EPA conducted sampling and monitoring along the coastal areas to assess the impacts of the *in situ* burns as well as possible volatilization of chemicals from the oil at the surface of the water. As the spill moves to and within the shoreline, and near-shore areas, EPA is concerned that the crude oil, the large quantity application of the dispersants, and response technologies may have negative short- and/or long-term impacts on human health and the environment. In order to examine the effects of the BP Spill on air, water and sediment quality, EPA plans to conduct further water, sediment, and air sampling, monitoring, and analysis along the U.S. Gulf Coast, including off the coasts of Louisiana, Mississippi, Alabama, Florida, and possibly Texas. The Agency also recognizes the potential for the oil to move with the Loop current around the tip of Florida and up the East Coast, and the need for flexibility to amend the samplings plans, as necessary. In order to monitor the impacts of the spill on the Gulf Coast region, EPA Regions 4 and Region 6 have developed Quality Assurance Sampling Plans (QASP) to collect data on the chemical contamination in air, water, and sediments. EPA has a detailed sampling plan for the 2010 National Coastal Condition Assessment which includes sampling in the Gulf of Mexico

estuaries. EPA will remain flexible in its response to the spill and sampling areas may shift if oil begins to impact other areas of shoreline.

METHODOLOGY OVERVIEW

EPA selected three potential areas of impact and will conduct sampling and monitoring in these three areas. The areas, relative to the Gulf shoreline, are far off-shore (3 – 50 miles from shoreline), near shore (within 3 miles of shoreline), and shoreline (due to variances along the Gulf Coast this includes beaches, bays, estuaries, and nearby populated areas). To evaluate the large quantities of dispersants used, this sampling plan is designed to provide EPA with information on the effects of both crude oil and chemical dispersants on air, water and sediment quality.

Locations:

- **Far Off-Shore**

- Air monitoring will be conducted by Airborne Spectral Photometric Environmental Collection Technology (ASPECT) aircraft to assess the air quality impacts from *in situ* burns.
- Locations for the deep water tracking of the oil plume will be coordinated with the National Oceanic and Atmospheric Administration (NOAA).
- Locations for assessing the effectiveness of the dispersants for dispersing the oil along the water column and impacts on aquatic life will be coordinated with NOAA.

- **Near Shore**

- Water sampling locations will be determined by targeting areas of ecological importance. The samples may be analyzed for the presence of oil and dispersants' constituents as well as aquatic life toxicity.
- Sediment sampling locations will be determined by targeting areas of ecological importance. The samples will be analyzed for the presence of some oil-related

indicators, aquatic toxicity and benthic infauna. Additional oil and dispersants constituents may be added as resources allow.

- Fish samples will be analyzed for a variety of contaminants as part of the NCCA, and polycyclic aromatic hydrocarbons (PAHs) can be added as resources allow.

- **Shoreline/Bays and Estuaries**

- The ongoing NCCA includes sample locations in the bays and estuaries of affected states. Samples will be collected for water, sediment and fish contaminant analysis. Additional sampling frequency and oil and dispersants constituents may be added as resources allow.
- Air quality sampling and monitoring will analyze for presence of key constituents of oil and dispersants.
- Water samples will be analyzed for the presence of oil and dispersants constituents as well as aquatic toxicity.
- Sediment samples will be analyzed for the presence of oil and dispersants constituents as well as aquatic toxicity.

Sampling and Analytical Approach

- For assessing the deep sea tracking of the oil plume and effectiveness of the dispersants, EPA is engaged with NOAA's efforts. Fluorescence monitoring will be used to provide data on the presence of oil plumes in the water column. Initial visual monitoring followed by real-time water column analysis utilizing a submersible fluorometer towed by boat at specified depths in the near-shore environment will be used.
- Water and sediment sampling and analyses in the nearshore and shoreline/bays and estuaries will include parent PAHs (sediment only and fish, if resource allow), volatiles including benzene, toluene, ethylbenzene, and xylene (BTEX), total metals, semi-volatiles, total petroleum hydrocarbons (Diesel and Gasoline range organics), and dispersants. Sample analyses of water will also include chemical oxygen demand (COD),

biological oxygen demand (BOD), and dissolved oxygen (DO). Ecotoxicity analyses will include acute and chronic testing of standard toxicity test species indicative of the Gulf. Analysis of fish tissue will occur as part of the NCCA.

- The air sampling program will include continuous, real time monitoring of particulate matter (PM) 2.5 collected by State and local air quality agencies and reported through the EPA AIRNOW program. In addition, continuous air quality screening will be conducted by EPA using monitors for PM10, total volatile organic compounds (VOCs), and hydrogen sulfide (H₂S). Daily (24 hour) air samples that are collected in SUMMA® canisters and sorbent cartridges will be analyzed for individual VOCs, and semivolatile organic compounds (SVOCs) ; target analytes: benzene, toluene, xylene, ethylbenzene, naphthalene, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Continuous, mobile air monitoring is being performed by the Trace Atmospheric Gas Analyzer (TAGA) laboratory as directed by EPA's Environmental Response Team (ERT). Pollutants measured include benzene, toluene and xylene or 2-butoxyethanol and a propylene glycol ether using the Sciex 365 triple quadrupole mass spectrometer (MS). Additionally, Tedlar bag sampling and analysis for benzene, toluene, and xylene as well as other VOCs are measured using the Agilent gas chromatograph/mass spectrometer (GC/MS). The TAGA is intended to be used to support on-site health and safety assessments and as such uses screening real-time detection techniques and established laboratory methods. Mission specified (flying during oil burning periods) open path air sampling via ASPECT air craft measurements for off shore measurements are taken by EPA National Decontamination Team and contractor staff. ASPECT routinely analyzes 24 chemical compounds through Fourier transform infrared spectroscopy (interferograms). Specific compounds measured include acetone, acrolein, acrylonitril, ammonia, 1,3 butadiene, chloromethane, ethanol, ethylene, freon 134a, isobutylene, isopropanol, MAPP, methanol, methyl ethyl ketone, methylene chloride, methyl tert butyl ether, n-butyl acetate, phosgene, propylene, and sulfur dioxide.

- Additional sampling may be necessary to determine the presence of free oil globules and/or surface oil at near shore surface water locations (i.e., within 100 feet of the shoreline), and characterize the oil and dispersant mixture that is reaching the shoreline. Sampling along beaches, marshes, tidal flats, or other shoreline types may continue in order to collect samples of fresh oil, mousse, tar, tarballs, or tar patties that have accumulated as part of the oil release.

SUMMARY OF EARLY RESPONSE ACTIVITIES

EPA and state governments operate ongoing, existing water and air quality monitoring programs in the Gulf, to which additional sampling, monitoring, and analysis activities were added as a direct response to the BP spill. In particular, EPA was able to use the National Coastal Condition Assessment and post-Katrina data to establish baselines for use in assessing pre-and post-impact data.

EPA is conducting air sampling of particulate matter (PM₁₀) as well as VOCs at multiple air sampling locations. Air sampling equipment include BGI PQ200 air samplers, used to collect air samples for PM₁₀ and SUMMA® canisters collecting ambient air for VOC analysis. SVOC air samples are collected in sorbent cartridges for laboratory analysis to evaluate odors and health impacts. Tedlar™ bags are being utilized to collect grab samples for VOC analysis as necessary.

Additionally, air monitoring activities include the use of E-BAM instrumentation to monitor the particulate levels, AreaRAE PGM-5020 to collect readings for VOCs, and MultiRAE instrumentation to monitor for H₂S. EPA has also utilized the TAGA Mobile Laboratory that provides mobile monitoring for the selected compounds of interest (i.e., benzene, toluene, ethylbenzene, and xylenes).

EPA has also been assessing water and sediment quality along the Gulf Coast. Multiple project teams were deployed in multiple locations collecting surface water and sediment samples and collecting real-time water data utilizing multi-parameter water quality instruments. Ecotoxicology studies were initiated during the first week of the spill to begin assessing the potential toxicity to aquatic life. Additional sampling to determine the presence of free oil globules and/or surface oil at near shore surface water locations (i.e., within 100 feet of the shoreline) was conducted to characterize the oil and dispersant mixture reaching the shoreline.

Samples of fresh oil, mousse, tar, tarballs, or tar patties that have accumulated as part of the oil release have been collected and analyzed. Samples were analyzed for VOCs, SVOCs, metals (including mercury), total petroleum hydrocarbon (TPH), oil and grease, toxicity in sediments, and total organic carbon